## APPENDIX III

## THE WATERWAYS EXPERIMENT STATION

Hydraulic laboratories were operating on a small scale throughout Europe in the early years of the twentieth century, expanding rapidly in the period following the First World War. In the United States, interest at the national level was stimulated in 1928, following the 1927 Mississippi River Valley floods. A bill to authorize establishment of a hydraulic laboratory in the Bureau of Standards in Washington, D.C. was passed by the Senate and reported to the House; hearings before the Committee on Rivers and Harbors were scheduled for 26 and 27 April 1928.

Testimony by Chief of Engineers General Edgar Jadwin and his staff at R & H hearings extending through February 1929, effectively blue-printed the type of experimental installation which would best fulfill the national need. General Jadwin suggested construction of a spacious field laboratory, sited in close proximity to the major problem area—preferably on the Mississippi River—where laboratory personnel could readily contact the field forces doing the actual river work. In accordance with provisions of the Mississippi River Flood Control Act of 1928, planning was begun for a laboratory building at Memphis, Tennessee, as directed by General Jadwin on 18 June 1929.

Before plans could be completed, orders were issued to relocate the project to Vicksburg, Mississippi. On 14 February, 1930 the Secretary of War approved purchase of 147 acres of land, five miles southeast of Vicksburg. Here was established a unique organization known as the Waterways Experiment Station (WES) of the Corps of Engineers. The name itself reflected the desire to preserve an identity distinct from the more general functions of the Hydraulic Laboratory of the Bureau of Standards.

Beginning with rudimentary facilities, a low budget and a young, unprejudiced staff, the station undertook and successfully completed the design and construction of models for large river studies at a time when the practical value of scale model experimentation was regarded with extreme skepticism. The station's project schedule increased rapidly. In addition to the original model studies of estuaries, facilities were added to conduct research in harbor development and channel stabilization, hydraulics, soils and foundations, concrete, nuclear weapons effects, erosion control, environmental effects, geology, terrain analysis, soil dynamics and rock mechanics. The Vicksburg installation sprawled outward, to eventually cover 595 acres. In 1942, 800 acres of land were acquired near Clinton, Mississippi for the Mississippi Basin Model Division; the initial construction was by German war prisoners. There in 1946, the Concrete Division was installed.

At its inception in 1929, WES was administered under the presidency of the Mississippi River Commission. In August, 1949 it came under the specific direction of the Office of the Chief of Engineers. The organization consists of an executive office with an advisory administrative staff and a technical staff of five divisions: Hydraulics; soils; concrete; mobility and environmental; and nuclear weapons effects. In addition, there are two support divisions: technical services and construction services.

WES is probably the largest institution of its kind in the world; at first concerned primarily with solving flood control problems for the Corps and other Federal Agencies, it has expanded its agenda to carry out a great variety of studies and investigations for other

agencies, industries and societies, world-wide. The original function of WES and still among its major activities was the model studies program; scale models of river systems and projected related structures (dams, bridges, harbor installations) were constructed and their behavior, mechanical functions and environmental effects studied and recorded. Philadelphia District projects for which WES has developed essential model study programs:

| Study or Investigation | Report Date | Report No. |
|---|---|---|
| 1. Plans for the Elimination of Shoaling in the Delaware River's entrance to the Chesapeake and Delaware Canal-(2 parts) | June 1936<br>July 1940 | TM 93-1<br>TM 93-3 |
| 2. Plans for Elimination of Shoaling in Wilmington Harbor, Del. | Aug 1942 | TM 194-1 |
| 3. Plans for Elimination of Shoaling in Absecon Inlet, N.J. | Sep 1943 | TM 204-1 |
| 4. Plans for Elimination of Shoaling in Deepwater Pt. Range, Del. River | May 1947 | TM 2-231 |
| 5. Plans for Elimination of Shoaling in New Castle Finns Pt. Rges., Del. River | Aug 1948 | TM 2-259 |
| 6. Flood Control Project for Allentown, Pa. | Dec 1953 | TM 2-376 |
| 7. Delaware River Model Study | | TM 2-337 |
| a. Report No. 1-Hydraulic and Salinity Verification | May 1956 | TM 2-337 |
| b. Report No. 2-Salinity Tests of Existing Channel | June 1954 | TM 2-337 |
| c. Report No. 3-Effects of Proposed Channel Enlargement Between Philadelphia and Trenton | Jan 1952 | TM 2-337 |
| d. Report No. 3-APP A-Tests of Alternate Alignments of Specific Reaches and Closure of Burlington Island Back Channel | Jan 1959 | TM 2-337 |
| e. Report No. 4-Dike Rehabilitation | May 1964 | TM 2-337 |
| 8. Effects of Salt Water Barriers Across the Delaware River | Sep 1959 | MP 2-358 |
| 9. Results of Hydraulic and Shoaling Studies in Marcus Hook—Schuylkill Reach of Delaware River | Mar 1967 | MP 2-887 |
| 10. Outlet Works for Beltzville Dam. Pohopoco Creek, Pa. | Dec 1969 | TRH-69-18 |
| 11. Spillway and Outlet Works, Tocks Island Dam, Delaware River | Jul 1970 | H-70-10 |
| 12. Tests of Proposed Improvements of Barnegat Inlet, N.J. (1969-71) | Report being prepared | |
| 13. Tests of Effects of Enlargements to the Chesapeake and Delaware Canal (Investigations in both Physical and Mathematical Models) | Underway | |
| 14. Salinity Intrusion Tests in Delaware River Model During Extreme Drought Conditions of 1965 | No report prepared. | |

Notes—Studies 1, 2, 4 & 5 were accomplished in the sectional model of Delaware River, extending from below Artificial Island to above Wilmington, Del. Studies 7, 8, 9, 13 & 14 were accomplished in the Delaware Estuary Model, extending from the Capes to Trenton, N.J.